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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/998,284	11/30/2001	Charlotte Horsmans Poulsen	674523-2012	5487
27890	7590	12/13/2006	EXAMINER	
STEPTOE & JOHNSON LLP 1330 CONNECTICUT AVENUE, N.W. WASHINGTON, DC 20036			NASHED, NASHAAT T	
			ART UNIT	PAPER NUMBER
			1656	

DATE MAILED: 12/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/998,284	<b>Applicant(s)</b> POULSEN ET AL.	
	<b>Examiner</b> Nashaat T. Nashed, Ph. D.	<b>Art Unit</b> 1656	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 October 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3,9-15,34,35 and 40-50 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,9-15,34,35 and 40-50 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

Art Unit: 1656

The application has been amended as requested in the communication filed October 17, 2006. Accordingly, claims 1-3, 32, 34, 35, and 38-42 have been amended, and new claims 43-50 have been entered. The status of claims 32, 38, and 39 are confusing as they are listed as "Canceled-Currently Amended", and therefore presumed canceled.

Claims 1-3, 9-15, 34, 35, and 38-50 are under consideration.

The rejection below is caused by the amendment of the claims, which made the claim prior art of record rejectable under 35 USC 102 (b) over the prior art of record of record.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 11-15, 34, 35, 40, 42, 49, and 50 are rejected under 35 U.S.C. 102(b) as being anticipated by Hamade *et al.* (IDS: reference AF, EP-0866103 A1).

Hamade *et al.* teach a method preventing fouling surfaces submerged in water by in which an anti-fouling agent is produced by an enzyme action on its substrate, and anti-fouling composition comprising an enzyme and its substrate, see abstract. They specifically teach several combinations of enzymes and substrates capable of producing hydrogen peroxide including the reactions catalyzed by glucose and hexose oxidase. See pages 5, lines 14-22. Also, they teach that the substrate of the enzyme that produces the antifouling agent can be generated by the action of another enzyme or enzymes, see page 3, lines 38-46, as well as the control release of the antifouling agent produced by the action of the enzyme in a paint composition (claim 1, 34, 35, 46, 49, and 50). In addition, Hamade *et al.* teach a coating composition containing the various many of the component listed in claims 41 and 42 including binder (claims 11 and 12), as well as coating various surfaces partially or totally covered with water (claim 13-15). See page 6, lines 28-39 and page 7, lines 14-17.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary

Art Unit: 1656

skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 9-15, 34, 35, and 38-50 are rejected under 35 U.S.C. 103 as being unpatentable over Hamade *et al.* (IDS: reference AF, EP-0866103 A1) in view of Hansen *et al.* [J. Biol. Chem. 272 (17), April 25, 1997, pages 11581-11587] and James *et al.* [J. Food Biochem. 1997, 21, 1-52] for the reasons set forth in the prior actions including the one mailed on April 18, 2006.

Claims 1-3, 9-15, 34, 35, and 38-50 are rejected under 35 U.S.C. 103 as being unpatentable over Hamade *et al.* (IDS: reference AF, EP-0866103 A1) in view of U. S. Patent 6,251,626 B1 [626 patent, Stougaard *et al.*] and James *et al.* [J. Food Biochem. 1997, 21, 1-52] for the reasons set forth in the prior actions including the one mailed on April 18, 2006.

In response to similar rejection in the previous Office action, Applicants assert that Hamade *et al.* do not teach the claimed composition because Hamade *et al.* do not teach or suggest the two-enzyme composition.

Applicants arguments filed 10/17/06 have been fully considered, but they are found unpersuasive. As indicated in the previous Office actions if Hamade *et al.* do not teach explicitly the two-enzyme system claimed they have clearly suggested the system. They specifically stated:

It should be understood that said compound having antimicrobial activity may be a compound obtained as the direct result of enzymatic reaction between the enzyme and the substrate or a compound formed from the product of such enzymatic reaction through further enzymatic or chemical reaction.

The statement as presented that the antifouling compound can be produced directly by the direct action of an enzyme on its substrate or through a compound formed through further enzymatic reaction. The statement does not qualify the number of enzymatic reactions or the source of other enzymes, and clearly indicates a multienzyme composition is within Hamade *et al.* teachings. Thus, the teaching of more than one enzyme to produce the antifouling compound is clearly suggested. The instant claims are broader in scope than the previously examined claims and are directed to a method in which a first substrate, in particular, a carbohydrate or sugar is converted by the action of a first enzyme to a second substrate, which is converted by hexose oxidase to peroxide, the antifouling agent. It is undisputed fact that an antifouling composition comprising the hexose oxidase and one of its multiple known substrate is taught by Hamade *et al.* Amyloglucosidase is a well known industrial enzymes used to convert starch to various products, and is commercially available in different form and properties, which would have provided motivation to the ordinary skill in the art to

Art Unit: 1656

specifically use the combination of amyloglucosidase and starch in the composition. Thus, the claims are *prima facie* obvious over the cited prior art of record.

Applicants allege Hamade's disclosure teaches away from the present invention as it suggests that a composition comprising an enzyme, substrate, and a film-forming resin is sufficient to overcome the problem of controlled release of the microbial agent. As indicated above and in several previous Office actions, that is possible because of the explicit suggestion if not teaching of two or more enzymes to produce the antifouling compound.

With regard to the argument that Hamade provide large list of non-limiting enzyme-substrate combinations, which generate a large number of different antimicrobial agents, the fact that Hamade *et al.* teach multiple enabled embodiment does not disqualify it as a prior art. The preferred embodiment in the instant application, which is the use of starch and amyloglucosidase to produce sugars, which in turn is oxidized with hexose oxidase meet the legal definition of obviousness based on the cited prior art of record. No matter how many time the applicant repeat that Hamade *et al.* do not teach or suggest two-enzyme system would not change the record and their state at page 3, line 38-46 and reproduced above. Contrary to applicants' allegation that Hanse *et al.* and James *et al.* do not remedy the defect of Hamade *et al.*, both reference provide motivation to one of ordinary skill in the art to use particular material used in the composition. See the rejection statement in the previous Office action mailed April 18, 2006. The '626 patent (Stougaard *et al.*) contains the same teaching as that of Hansen *et al.* New claims 43-50 are include with these rejection because they are directed to the same subject matter of claim 1.

No claim is allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Art Unit: 1656

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nashaat T. Nashed, Ph. D. whose telephone number is 571-272-0934. The examiner can normally be reached on MTWTF.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kathleen M. Kerr can be reached on 571-272-0931. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Nashaat T. Nashed, Ph. D.  
Primary Examiner  
Art Unit 1656